

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
2 October 2003 (02.10.2003)

PCT

(10) International Publication Number  
**WO 2003/079897 A3**

(51) International Patent Classification<sup>7</sup>: **A61B 5/0408**

CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(21) International Application Number:  
**PCT/CA2003/000426**

(22) International Filing Date: 26 March 2003 (26.03.2003)

(25) Filing Language: English

(84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

(26) Publication Language: English

(30) Priority Data:  
2,379,268 26 March 2002 (26.03.2002) CA

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

(71) Applicants and

(72) Inventors: **BRUN DEL RE, Riccardo** [CA/CA]; 21 Park Street, 2nd Floor, Suite B, Aylmer, Quebec, J9H 4J6 (CA). **KOLPIN, Hans** [CA/CA]; R.R.#1, White Lake, Ontario, K0A 3L0 (CA). **BATKIN, Izmail** [CA/CA]; 911G-Elmsmere Road, Gloucester, Ontario K1J 8G4 (CA).

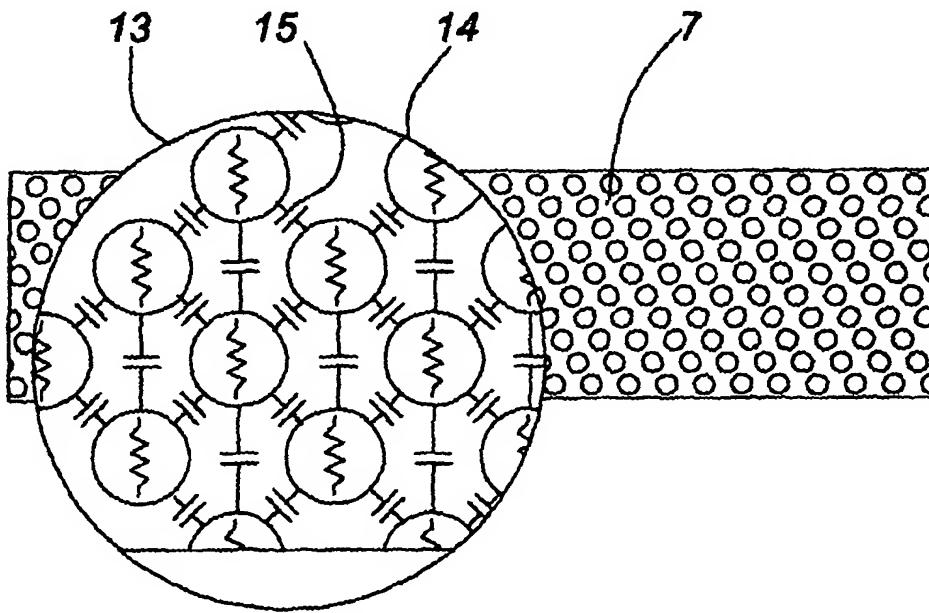
(74) Agent: **FRENCH, David, J.**; P.O. Box 2486, Stn. D, Ottawa, K1P 5W6, Ontario (CA).

(88) Date of publication of the international search report:  
5 February 2004

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,

For two-letter codes and other abbreviations, refer to the "Guide to the Use of Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SKIN IMPEDANCE MATCHED BIOPOTENTIAL ELECTRODE



(57) Abstract: A bio-electrode for detecting heart signals and the like comprises a dry electrode surface having an elevated resistivity to reduce the effect of polarization noise. The electrode is combined with a circuit having an external discharge resistor across which an output signal is obtained wherein the discharge resistor has a value which reduces the time constant of polarization noise to less than one second.

## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/CA 03/00426A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 A61B5/0408

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 581 821 A (CAHALAN PATRICK T ET AL) 15 April 1986 (1986-04-15) example 3 -----	1
A	US 3 923 042 A (HAJDU LASZLO ET AL) 2 December 1975 (1975-12-02) figure 1 -----	1,3
A	US 4 669 479 A (DUNSEATH JR W J ROSS) 2 June 1987 (1987-06-02) claim 2 -----	1
A	US 5 354 790 A (KEUSCH PRESTON ET AL) 11 October 1994 (1994-10-11) table II -----	1

 Further documents are listed in the continuation of box C. Patent family members are listed in annex.

## \* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

Date of mailing of the international search report

7 July 2003

01.12.2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Clevorn, J.

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA 03/00426

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.  Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:
  
2.  Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
  
3.  Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1.  As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
  
2.  As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
  
3.  As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
  
4.  No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1, 3-9, 13, 14

### Remark on Protest

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1,3-9,13,14

bio-electrode with a body-directed surface comprising a plurality of relatively conductive areas connected to conductive pathways passing through the bio-electrode, said islands being surrounded by generally nonconducting background material  
---

2. claims: 2,10-12,15-20,22-24

a bio-electrode with an external signal-detecting circuit that provides for the rapid discharge of polarization-generated noise while still permitting maintenance of a satisfactory signal capture ratio  
---

3. claim: 21

bio-electrode with a substantially non-adhesive body-directed surface  
---

4. claim: 25

two body-electrodes in combination with a common mode noise differential sensing circuit  
----

**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No  
PCT/CA 8/00426

Patent document cited in search report	Publication date	Patent family member(s)		Publication date
US 4581821	A 15-04-1986	US 4391278 A		05-07-1983
		CA 1153427 A1		06-09-1983
-----	-----	-----	-----	-----
US 3923042	A 02-12-1975	HU 168079 B		28-02-1976
		CA 1037127 A1		22-08-1978
		DE 2449091 A1		17-04-1975
		FR 2247724 A1		09-05-1975
		IT 1022729 B		20-04-1978
		NL 7413489 A		17-04-1975
		SE 403043 B		31-07-1978
		SE 7412892 A		16-04-1975
		SU 558620 A3		15-05-1977
-----	-----	-----	-----	-----
US 4669479	A 02-06-1987	AU 6228286 A		10-03-1987
		BR 8606839 A		27-10-1987
		EP 0232412 A1		19-08-1987
		JP 63500644 T		10-03-1988
		WO 8701024 A1		26-02-1987
		US 4865039 A		12-09-1989
		US 5003978 A		02-04-1991
		US 4763659 A		16-08-1988
		US 4751471 A		14-06-1988
-----	-----	-----	-----	-----
US 5354790	A 11-10-1994	US 4989607 A		05-02-1991
		US 5143071 A		01-09-1992
		AU 652717 B2		08-09-1994
		AU 5359390 A		05-11-1990
		DE 564448 T1		16-06-1994
		EP 0564448 A1		13-10-1993
		ES 2053417 T1		01-08-1994
		FI 924401 A		30-09-1992
		NO 923776 A		29-09-1992
		OA 9675 A		15-05-1993
		WO 9011719 A1		18-10-1990
-----	-----	-----	-----	-----